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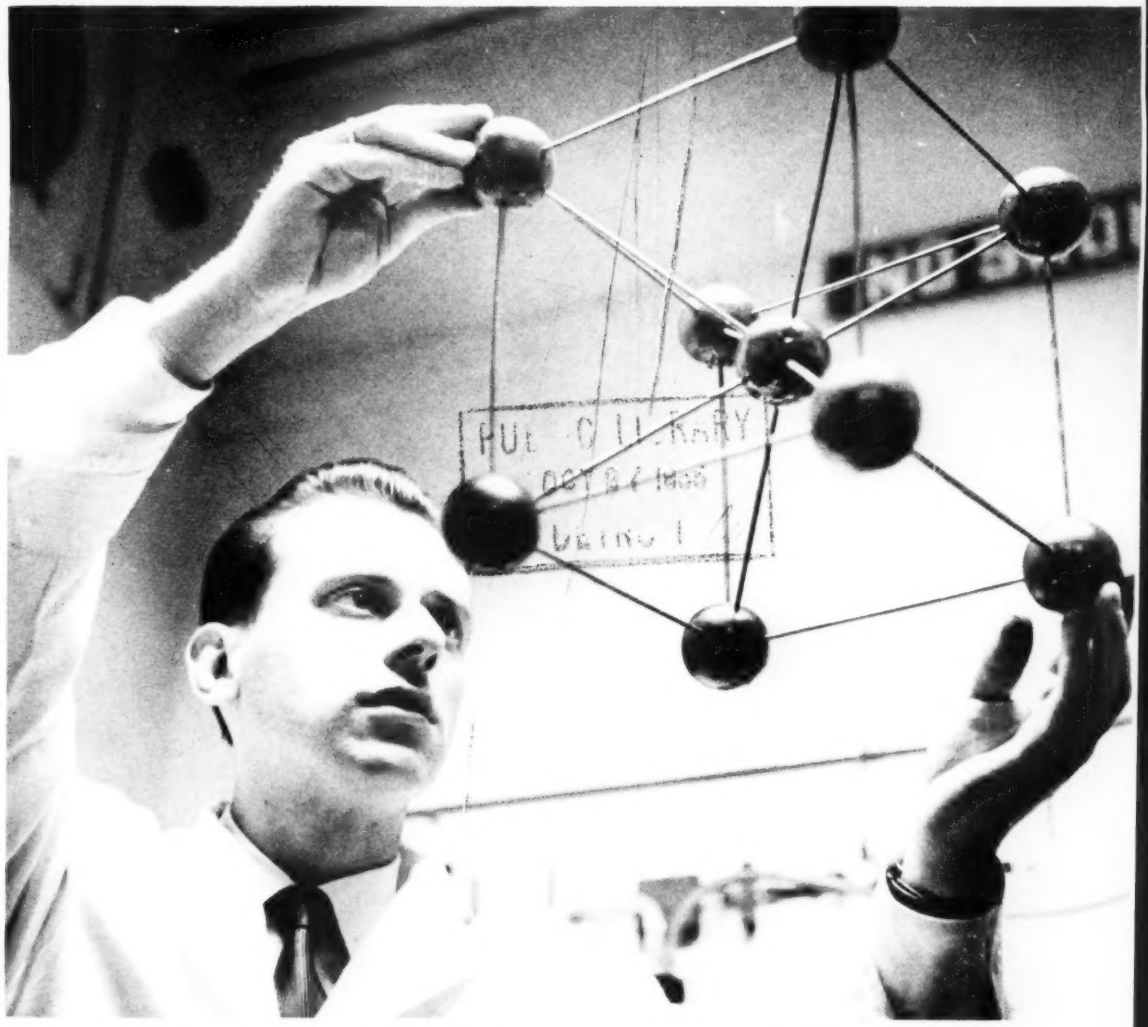

WESTERN SOCIETY OF ENGINEERS FOUNDED 1869

LOW COST MASONRY SCHOOLS—PAGE THREE

Vol. 8 OCTOBER, 1955 No. 5

Looking up through the furnace of one of the C-E Controlled Circulation Boilers at Oak Creek. As high as a 12-story building and as wide as a super highway, this furnace has a total volume equivalent to that of 7 average 6-room houses.

Wisconsin
Electric Power Company

A STORY OF PIONEERING

In the annals of America's great industrial achievements, a few names stand out. They are the pioneers, the companies whose work has advanced technology in major steps. Such a company in the field of power generation is the Wisconsin Electric Power Company. Its first big pioneering step was taken 35 years ago when it built . . .

A power plant that made Milwaukee famous

In 1920, the use of pulverized coal as a fuel for boilers was virtually unknown in the utility industry. Wisconsin Electric, after 5 years of development work in an older plant, took the bold step of designing a large new power station (the Lakeside Station) for the exclusive use of pulverized coal. Lakeside not only proved the practicability of pulverized coal but became the world's most efficient power station. Power engineers from all parts of the country and abroad came to Milwaukee to observe and learn. Pulverized coal made a major contribution to the economy of power generation and has long since become the universal method of burning coal in electric power stations.

Wisconsin Electric took its next big forward step in 1930 when it started construction of its Port Washington Station.

Port Washington set new efficiency record

Port Washington was unique among American power stations in that it not only set a new efficiency record during its first years of operation but maintained its position as *the world's most efficient power station* for 13 years. It had other claims to fame as well. Its boilers were the largest high-pressure boilers then built and established new reliability records in service.

And then came Oak Creek

Now Wisconsin Electric has erected another landmark on its "road of achievement" with its new Oak Creek Station, placed in service in late 1953. Oak Creek, like its famous predecessors in the Wisconsin system, introduces important innovations in design and is noteworthy among the outstanding power stations of today.

• • •

And what is Combustion Engineering's part in the Wisconsin Electric story? Just this. Combustion pioneered pulverized coal burning from the manufacturer's side, and designed and built all the pulverized coal equipment installed at Lakeside, Port Washington and Oak Creek. It supplied the boiler units installed in the Port Washington Station. And at Oak Creek, Wisconsin Electric now has in service two of Combustion's most advanced type of controlled circulation boilers, with a third being installed.

Wisconsin Electric, pursuing its forward looking policy, was among the first to recognize the special advantages of the controlled circulation boiler which, in the past five years, has achieved an acceptance by utilities never before accorded a basically new design. B-856

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Serving the Engineering Profession

OCTOBER, 1955 Vol. 8, No. 5

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COVER STORY

Pure and perfect crystals of iron, which duplicate exactly the model held by Dr. A. W. Cochardt, have been "grown" on an unprecedented scale by scientists at the Westinghouse Research Laboratories. Made in the form of thin slivers, or "whiskers," such iron crystals exhibit fantastic strengths—as much as a million pounds per square inch. The crystals provide perfect specimens for fundamental research on the properties of pure metals.

—Westinghouse photo

The meeting of Oct. 25

Free Cocktail Hour

5:15 to 6:15 p.m.

Dinner

6:30 to 7:30 p.m.

Coffee Talk

7:30 to 7:45 p.m.

Session 1.

8:00 p.m.

"What Next—Atomic Energy?"

Uses of gamma irradiation to alter the properties of plastics, preserve food, etc.

By H. Gladys Swope, Senior Chemist, Argonne National Laboratory

Miss Swope will describe with pictures gamma irradiation on the preservation of food, the improvements of plastics and other chemical reactions. Military and peaceful uses of atomic energy discovered to date has spurred scientists to intensify their efforts to determine its effect on a wide variety of materials. Come and hear "what's cookin'."

Sponsored by Chemical & Metallurgical Section

Chairman: Harry P. Hagedorn, City of Chicago

Session 2.

8:00 p.m.

"Push Button Trains"

Centralized Control of Elevated Train Operation

By George Krambles, Operations Planning Engineer, CTA

Mr. Krambles' illustrated talk will describe the installation and operation of the CTA system of "Line Supervision" on the Elevated Lines. Come and see how trains are started from their terminals automatically and how their travel is recorded graphically in the supervisor's office. Also learn how the PBX and loud speaker systems permit communication with control towers, train crews enroute and station agents at points along the line.

Sponsored by Communications Section

Chairman: Theodore H. Cole, Western Railroad Supply Co.

Session 3.

8:00 p.m.

"4-11 Alarm"

Modern Fire Protection and Industry

By W. E. Healey, District Manager, Walter Kidde and Company, Inc.

Walter Kidde & Company has been a pioneer of present day fire protection. Mr. Healey will tell a most interesting story of the present day problems. To illustrate the talk there will be a color movie which recently won a National award for being one of the best educational films on safety. This program is a natural at this time in view of mounting fire losses.

Sponsored by Fire Protection and Safety Section

Chairman: Cecil O. Bernard, U. S. Fidelity & Guaranty Co.

October 26, Noon Luncheon Meeting

Speaker: Dan J. Iverson, engineering consultant, Arthur Rubloff & Company.

Subject: "Tenants and Headaches."

A Design Study of

Low Cost Masonry Schools

By M. H. Allen

The tremendous and continuing need for additional school facilities has created an unprecedented school construction program. This urgent need has created serious financial problems in many school districts—problems involving ways and means of constructing the required school facilities with the limited funds available.

Someone has said that the paramount question before the country today is "How much is the down payment?" Probably the world's greatest humorist was the man who called "installments" "easy payments." These "gems of wisdom" hold true whether applied to the head of a household buying an automobile, a TV set or a new washer for mother or to a harassed school board trying to find money with which to build new buildings and budgets to maintain them after they are built.

Aware of this situation, and recognizing its responsibilities as the producer of one of the basic building materials for school construction, the Structural Clay Products Industry, through its Research Foundation and its architectural consultants, Howard T. Fisher and Associates, has investigated school building design. No attempt has been made to conduct a fundamental study of basic educational philosophy and its effect on school architecture. The study was limited to better techniques in building which could result in lower construction costs and maintenance economies.

From this study has come a school design concept which has certain basic economical advantages and which was intended to stimulate creative thinking among architects and engineers which will — it is hoped — lead to numerous variations and refinements. In no sense is this concept intended to be a stock plan nor is it considered to be the only answer to low-cost school construction using clay products.

Mr. Allen, the author of this paper, a recognized authority in his field, is affiliated with the Structural Clay Products Institute, Chicago. He presented this before the Western Society of Engineers.

In an article entitled "School Plant Programming" which appeared in a recent issue of the "Bulletin of the American Institute of Architects," Charles R. Colbert, AIA, stated: "As an architect you need not fear that I recommend prototype schools or pernicious stock plans. They are another great evil. I do recommend standardization of parts in some cases and of procedures just as we accept modular coordination." Our industry heartily endorses that statement.

The Structural Clay Products Research Foundation, in developing its school design study, adopted an approach to school building design wherein the properties of clay masonry would be utilized to the greatest extent consistent with good practice and in which the cost of the building would be reduced to the logical minimum. In doing so, it was not considered appropriate to utilize radically new structural concepts or unusual combinations of materials. Although many such new design theories have merit, they are usually not available for widespread application until after they have been thoroughly tested and used. In this study care was taken to keep the entire design concept within limits imposed by the range of skills and materials ordinarily available to contractors in small towns and large cities alike.

The investigation was governed by certain currently accepted trends in school building design:

1. School buildings tend to be basically cellular in character and are usually permanent in internal arrangement. It is realized, of course, that there is not complete agreement among school people and architects as to the type of flexibility required in school building design. One school of thought appears to look upon classroom flexibility as "room-size" flexibility, in which case non-load-bearing movable partitions would be required. The other school of thought looks upon classroom flexibility as meaning "room-use flexibility," in which case

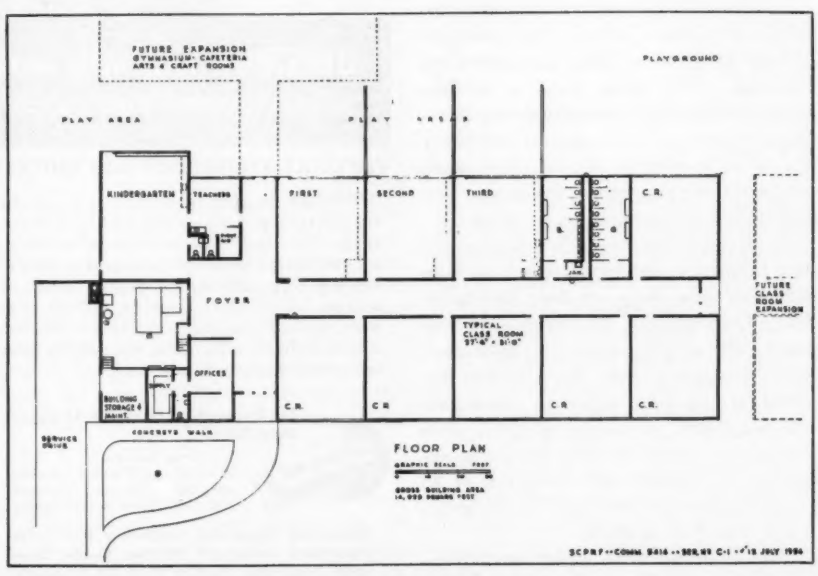

Figure 1. Floor Plan

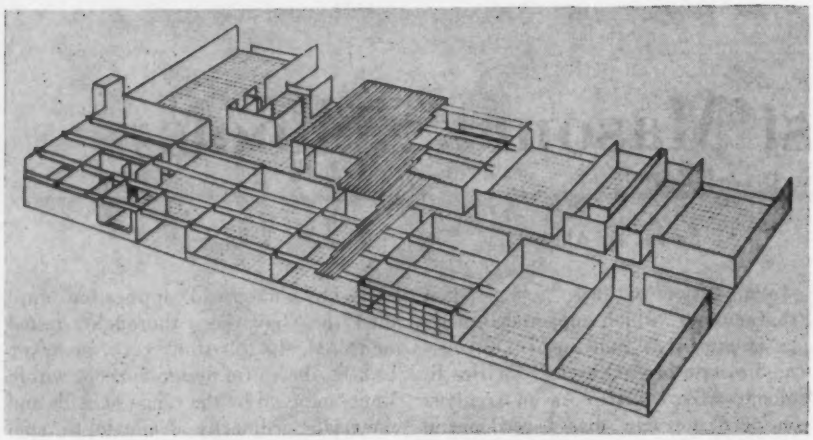

Figure 2. Roof Beams run parallel to length

permanent partitions can be used and can be made load-bearing. Generally speaking, the latter school of thought seems to prevail, hence our decision to base our design concept on the latter philosophy of school building design.

2. School classrooms are currently being designed with lower ceilings—10 feet or even less. A recent survey by the A.I.A., the results of which were reported in the September-October 1954 issue of the Bulletin, bears this out. This reduction in ceiling height, made possible by better lighting and ventilating equipment, results in substantially reduced construction costs. Because of the improved acoustics and scale, it is also claimed to result in improved pupil comfort and educational environment.

3. The exterior walls of the classroom areas in today's schools are predominently of glass or other non-structural materials. For these walls to assume structural functions necessitates a framing system of piers or columns and heavy lintels or spandrels. By relieving these walls of their supporting functions, considerable cost savings can be effected.

4. Except where site conditions dictate otherwise, the trend in school construction today is to one-story structures. Exceptions to this, of course, are features such as gymnasiums, auditoriums, or all-purpose rooms. Recognizing this trend, it appeared logical to investigate the feasibility of using relatively thin load-bearing clay masonry structural elements, so located and designed as to impart maximum efficiency to the structural system as a whole.

The building type which was developed as a result of this design study has as its basic structural element an "L" shaped clay masonry wall which is repeated as necessary to build up the required floor plan. As may be seen in Fig. 1, these load-bearing partitions are so located as to be free of openings or other details which would tend to complicate and thereby increase the cost of the masonry. Each wall is an independent structural element and involves only three plumb points where the bricklayer must use his level. None of the walls exceed 10 feet in height, a feature which also facilitates a simplified construction technique and lowers costs.

In Fig. 2, it can be seen that the roof beams run parallel to the length of the building and are supported by the partition walls. Since the spans between the load-bearing classroom partitions will normally be less than 30 feet, a number of different roof systems may be employed. The system incorporated in this design study involves the use of a series of 8" x 16" built-up wood beams or girders with maximum spacings of 8'-0" supporting a 2 inch tongue and groove wood decking. A 3 inch wood decking spans the corridor, eliminating the necessity of additional structural support at this point.

Except for the end walls, the exterior walls of the building are non-structural curtain walls serving only to transmit wind loads to the structural partitions.

(Continued on Page 14)

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A Guide for

Making Job Studies

By John D. Gallagher

The procedure outlined below of making job studies for the purpose of improving job methods is intended primarily for the use of the safety engineer, but the general principles discussed may also be of interest to industrial supervisors and others interested in work methods improvement.

Many industrial operations involve inherent hazards which result in employee injuries, and these hazards are often such that the logical approach to their elimination or better control is by making a job study. In many cases this study must be made by the safety engineer if it is to be made at all. The plan outlined below for eliminating inherent accident hazards by improving job methods is presented to give the safety engineer a definite plan he can follow, the basic principles of which have been widely and successfully used in industry for many years.

It is generally recognized that there is a definite relationship between safety and efficiency of production, and proper application of the principles outlined below should enable the safety engineer to arrive at possible improvements in job methods which will tend to improve both safety and efficiency of production. Such improvement is usually accomplished by making more efficient use of the equipment, materials, and people already available, and by improving rather than interfering with production efficiency.

Improvement of job methods is accomplished in general by following a definite pattern of questioning all job details, which discloses how:

(1) certain details of the job can be eliminated by using alternative methods of accomplishing the desired end result;

(2) various details of the job can be combined to reduce hazards, and unnecessary transportations, storages, delays, handlings, and inspections between operations;

(3) job details can be arranged for better sequence, to reduce hazards, and unnecessary transportations, storages, delays, handlings, and back-tracking; and

(4) necessary details of the job may be simplified, so as to make the work safer and easier, by applying certain principles discussed below.

This method of making job studies consists of four basic steps, as follows:

I—Break down the job;
II—Question every detail of the job;
III—Develop the new job method;
IV—Apply the new method.

Step I

Improved job methods provide safer and better work because production is improved by eliminating unnecessary parts of the job, and by combining, rearranging, and making the necessary parts safer and easier to do. A job break-down is the starting point for all job methods improvement, and should include all elements of material handling, machine work, or hand work that are involved in the job. Listing all details of the job provides a word picture of the job, and provides a complete record and accurate picture of exactly how the work is done. The word "detail" as used here means "every single thing that is done, every inspection, every delay."

Most of us become so familiar with the details of the things we do day-in and day-out that they become part of a subconscious habit pattern, so that we are often unaware of many details that are actually involved in the present method of the job, until we make a detailed and accurate break-down. A break-down often brings out many details about the job we never realized were there, and indicates the possibility for improvement when we apply the subsequent steps of the plan. The more detailed and accurate our break-down is, the more complete will be the improvement we may be able to accomplish. In making job studies the break-down should be made on-the-job, rather than from memory; and we can never tell in advance which of the details listed from actual job performance may give us a clue to an important improvement in the job method, which will minimize the inherent hazards and improve work efficiency. In some instances the questioning of a single key detail has resulted in virtual elimination of the operation; whereas if this particular detail had been left out of the breakdown, such sweeping improvement would not have been developed.

The listing of job details can be illustrated by a simple job of inspecting and riveting together one plain and one tinned metal sheet into a simple assembly. The first six details as listed in the job break-down are:

(1) Walk to box of tinned sheets. (Placed 6′ from bench by handler).
(2) Pick up 15 to 20 tinned sheets.
(3) Walk to bench.
(4) (a) Inspect, and (b) lay out 12 sheets. (Scrap in barrel for scratches or dents).
(5) Walk to box and replace extra sheets.
(6) Walk to box of plain sheets. (Placed 3′ from tinned sheets by handler.)

These details will be further referred to below.

Step II

After breaking down the job, Step II should be applied by questioning each detail listed in the break-down, using the following questions:

1. Why is it necessary?
2. What is its purpose?
3. Where is the best place to do it?
4. When should it be done?
5. Who is best qualified to do it?
6. How is the best way to do it?

The success of any job improvement depends upon our ability to develop a questioning attitude about the details of the job, along the lines indicated by these questions. Impartial questioning of each detail is of the utmost import-

Mr. Gallagher, author of this paper, is assistant superintendent, Engineering Department, Hartford Accident and Indemnity Company. He is a member of the American Society of Safety Engineers.

ance. Sometimes an outsider can spot methods improvements simply because he knows nothing about the job, and the answers to his impartial "whys," or lack of a good answer, point the way to improvements. Such questioning generates ideas for improvement; taking nothing for granted, and getting the facts of the present method. Oftentimes a present method is being followed only because the job "grew up that way"; and for best results it is essential that the questioning be done from the viewpoint that the method can be improved, and its waste eliminated. Just because the job has always been done by the present method is no indication that it cannot be done better in some other way. It must be approached openly and without any assumptions, preconceived ideas, or bias. In lieu of accepting superficial answers, we must keep on asking our questions until we get down to the basic elements of those bare essentials which are necessary to achieve the end result of the operation.

For successful application of this plan we must deliberately question all the details of the job; and we should complete the application of these questions to each detail in turn, before proceeding on to questioning of the next detail. These questions should be applied to each detail in the order in which the questions are listed; since it is obvious that if the first question indicates the detail may be unnecessary, it then becomes superfluous to ask any of the other questions. The answers we get to these questions will give us the clues we will need to make job improvements when we later apply Step III of the plan.

The first question, "Why is it necessary?," will enable us to distinguish a detail that is essential to the end result of the job, from details that may be unnecessary, or of doubtful necessity, if the end result can be accomplished in some easier or simpler way. For example, if the detail is one of the machine operator walking to a stock-pile of material, perhaps that detail can be eliminated if the stock can be kept at the operator's work position, within arm's reach.

The first question, "Why is this detail necessary?," is a most important one, because it often provides information that makes possible considerable improvement of methods in jobs where questioning discloses many unnecessary details. However, this question is often the hardest to get answered properly, and so the second question, "What is its purpose?," is a check question. It helps us make sure that we get a true answer as to whether the detail is necessary, by making us consider whether the detail involved does have a useful purpose, and is essential in that it does change the condition of the product to further it towards final completion. If it does not meet this requirement it is not necessary in itself, and can possibly be eliminated if the end result it accomplishes can be achieved in some simpler way.

The third question, "Where should it be done?," is asked to find the best place to perform it; that is, in which department, on which machine, bench, equipment, or other place. Must it be done at the present location, and can it be done safer, easier, or better by

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changing location of the person, equipment, or operation?

For example, a plant using considerable quantities of paraffin was receiving it in steel drums, which had to be cut open, and the paraffin then cut into small pieces of proper size to be placed easily into melting pots. A back strain due to heavy lifting on this job resulted in four weeks of lost time, and a study of the job was made to try to eliminate the hazard. Applying the question, "Where should it be done?," to the detail of cutting the wax into small pieces, the answer suggested itself, "It could best be done at the supplier's, before it is shipped to us." This possibility was investigated, and it was found that wax could be received at the plant in pieces of proper size to place directly into the melting pots, and wrapped in paper cartons which were easily removed. Wax in this form could be purchased at a lower cost than in steel drums, and the time required for preparing wax for these pots was reduced from 8 to 1 man-hours per day. As a result of this job study the inherent safety hazard was eliminated, and a substantial saving in labor cost, and in cost of materials purchased was achieved. This plant had been buying wax in drums for over 16 years, and on the basis of the reduction in man-hours alone, they had spent during this 16 years more than $32,000 for unnecessary labor.

The fourth question, "When should it be done?," is asked to consider whether the detail can better be done in some other part of the processing sequence. Must it be done at the present point in sequence, and can it be done safer, easier, or better by changing the time or sequence of performance.

For example, some injuries occurred on a job of burnishing some plastic parts. When this question was applied in a job study, the answer suggested itself that the burnishing could be done at an earlier stage of the processing sequence in conjunction with the earlier tumbling of these parts for another purpose. It was found that a better finish could be achieved by a special tumbling process, immediately after the earlier tumbling process already in effect. By changing this to the earlier sequence in the processing operation, the injuries incurred in hand burnishing were eliminated, as were unnecessary transportation, handling, and inspection of these parts.

The fifth question, "Who is best qualified to do it?," is asked primarily to determine who is best for the job from the standpoint of skill, experience, etc., or from the standpoint of who is already performing a similar detail of processing with which the detail in question might be combined. Can it be done safer, easier, or better by someone else?

For example, accidents were occurring on a press which was being manually operated to stamp some lettering in a sheet metal housing, which had previously in the processing had certain holes punched out of the same surface in which the lettering was being stamped. This question suggested that the stamping of lettering could be com-

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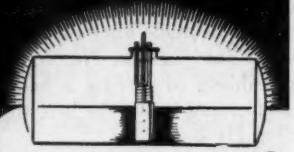

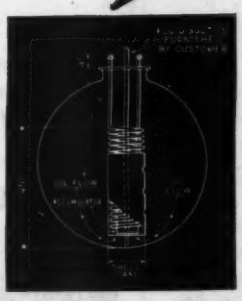

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bined with the punching of holes performed in the other department, and this change was made. As a result, the injury exposure in connection with stamping was eliminated, as were unnecessary transporting, handling, and inspecting of the parts after stamping of the lettering.

The sixth question, "How is the best way to do it?," is asked of every necessary detail after the previous five questions have been applied, so that a special check will be made in Step III, as referred to below. If the previous five questions fail to disclose any possibility of improving the detail, it may still be possible to find a better way of performing it.

In Step I each detail of the job was listed, and in Step II each detail has been questioned as indicated. In applying the first two questions to each detail, if any clue is suggested as to an alternate way of performing a detail which might eliminate that detail, or if any answers to the questions "Where," "When," and "Who" suggest themselves, a note of the ideas which suggest themselves should be entered after the detail, so that these ideas can be considered when Step III is applied. If the first two questions do not suggest any possibility of eliminating a detail, then the note should be made after that detail "Better way" for question No. 6; so that the possibility of finding a better way for performing it may be investigated when Step III is applied.

This means that there will be an answer of some kind noted after each detail, as a result of applying the above questions; because Step II is intended to develop possibilities for improvement which will be checked and put into application in Step III. Step III is a part of the plan in which the actual improvement of the present method, including elimination of inherent accident exposures, is achieved.

As a brief illustration, questioning of the six details of the riveting job previously listed resulted as in Figure 1.

Detail No. 4(b) "lay out 12 sheets" is unnecessary if one plain and one tinned sheet can be picked up by each hand from piles at the riveting position, inspected, and inserted directly into the riveter; which also eliminates the details of walking to and from the supply boxes.

However, no methods changes should be made until each detail of the present method has been fully questioned. Methods changes should be made only in Step III.

Figure 1.

Detail	Answers to Questions
(1) Walk to box of tinned sheets.	Not necessary—if sheets nearer bench.
(2) Pick up 15 to 20 tinned sheets.	Best place—close to riveter. Better way.
(3) Walk to bench.	Same as No. (1).
(4) (a) Inspect, and	(a) Best place—just before assembly. Better way.
(b) lay out 12 sheets.	(b) Not necessary — if sheets nearer bench.
(5) Walk to bench and replace extra sheets.	Same as No. (1).
(6) Walk to box of plain sheets.	Same as No. (1).

Before leaving Step II, there is another important process of questioning which should also be applied to eight factors of the job. As a result of questioning these factors it may be possible to eliminate or combine the job with some other part of the process, or to accomplish an important improvement in the accident exposure, man-hours required, materials required, machine-hours used, etc.

(Continued on Page 19)

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Wilson Given Washington Award

Charles Erwin Wilson, Secretary of Defense, has been selected to receive the 1955 internationally recognized Washington Award for his "significant leadership in engineering and management and for his altruistic devotion to national defense."

This Award which was announced Oct. 9 by the Washington Award Commission is sponsored by the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Society of Electrical Engineers and is administered by the Western Society of Engineers of Chicago. Since the Award was founded by John W. Alvord in 1916, an engineer has been selected each year whose contributions to society have gone far beyond the fields of engineering and science. The first recipient of the Award in 1919 was Herbert Hoover and in 1954 Dr. Lillian Gilbreth was selected.

As an assistant to Carl G. Lamme, Chief Engineer at Westinghouse, Charles Wilson became interested in the automobile electrical equipment work at Westinghouse and was placed in charge of this phase of the business. During World War I he was sent to Washington and designed and developed radio generators and dynamotors for the Army and Navy. He also developed a primitive crystal set, granddaddy of the "walkie-talkie" for the infantry and a little generator designed for wing mounting on the 1918 planes. He also designed the electrical equipment for the Army's "B" truck.

This experience led him into the Delco-Remy Co. where he made many contributions to the development and production of automotive electrical and ignition systems and from this to a position where he headed up the entire group of General Motors accessory companies. His outstanding work as an engineer and administrator ultimately landed him in the top executive post of General Motors.

Charles Wilson has exerted a tremendous influence in improving the relations between management and labor. His "escalator" clause in long term labor contracts and his "improvement factor" to increase labor's share in technological improvements changed the national thinking on labor relations.

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Automation Exhibit To be Held in Chicago

Chicago, industrial hub of the United States, will become the center of attraction to all engineers and executives interested in plant and office automation when the Second International Automation Exposition opens its 4-day stay at Navy Pier, Nov. 14 to 17.

Products on display will include all equipment and components necessary to "automate" any process in office or plant—from automatic assembly, handling, and data processing equipment, to subminiature relays and switches.

In addition to the products displayed by 200 exhibiting manufacturers, the show will feature two lecture-demonstration clinics (one on electronic computers and one on conveyor automation) sponsored by the show management. Also a 2-day "Senior Officer Conference on Office Automation" directed by Gordon L. Mattson and sponsored by the University College, University of Chicago, will be held in cooperation with the show. And a 1-day conference on "Electronic Computers" will be sponsored by the Midwest Chapter, Armed Forces Chemical Association.

The central city itself is well represented with 26 Chicago-headquartered firms exhibiting at the show.

ASME to Celebrate 75th Year

The American Society of Mechanical Engineers will depart from tradition by holding its annual meeting in Chicago, Nov. 13-18, with this six-day conclave packed tight with events ranging from the technical to the theatric for a dramatic climax to the ASME 75th anniversary year.

The Jubilee theme is "The Engineer and the World of Commerce and Industry." As in previous ASME meetings this year, the overall objectives include new ideas, plans and projects for the building of America's engineering strength.

This is the first annual meeting to be held in Chicago and more than 4,000 engineers are expected. Advance registrations also indicate that more than 1,000 ASME member wives will be Jubilee visitors to brighten the social side of the meetings.

Co-chairmen of the Chicago Section Jubilee committee are James D. Cunningham, MWSE, Republic Flow Meters Company, and Alex D. Bailey of LaGrange, formerly with the Commonwealth Edison Company. Both are past presidents of the ASME.

A feature of the Jubilee will be the special dinner and "Cavalcade" planned for the night of Nov. 15. The Cavalcade, according to advance billing, will "dramatize in pageant form the society's history with co-related highlights from the field of entertainment." It will be professionally cast and produced.

On the more serious side will be some 100 technical sessions, each related to the Jubilee theme, the president's luncheon, the annual banquet, honors luncheons and another for members and students.

Chairmen of other Chicago Section committees are: Robert H. Bacon, MWSE, R. H. Bacon & Company, general arrangements; Charles W. Parsons, Republic Flow Meters Company, secretary, executive committee; Eugene C. Bailey, MWSE, Commonwealth Edison Company, liaison; Dr. John T. Rettaliata, MWSE, Illinois Institute of Technology, and Prof. Edward F. Obert, Northwestern University, co-chairmen of the technical program;

Andrew J. Snider, MWSE, Combustion Engineering Corporation, hotel arrangements; Eugene P. Berg, Link Belt Company, finance; Frank D. Cotterman, Crane Company, registration; John Dolio, MWSE, Shaw, Metz & Dolio, publicity; Arthur B. Openshaw, MWSE, Combustion Engineering Corporation, entertainment; William H. Pletta, Commonwealth Edison Company, plant inspection; Frank J. Hamilton, Bayley Blower Company, reception; William Dundas, Sanitary District of Chicago, banquet;

Robert J. Mindak, Armour Research Foundation, associate and student; Paul Berndt, consulting engineer, commemoration, and Thomas S. McEwan, membership.

Mrs. Alexander Cowie is chairman of the Chicago Section Women's Auxiliary committee handling the ladies' events.

Space Symposium

With projected space flights to satellites so much in the news, concurrent sessions of the American Rocket Society will also be well attended by ASME Jubilee visitors. The ARS will join with the ASME for social activities and will conclude its own sessions Nov. 16 with a "space symposium" and honors dinner.

Also concurrent with the ASME Jubilee will be the Chicago Exposition of Power and Mechanical Engineering at the Coliseum.

The Congress, Conrad Hilton and Blackstone hotels will be headquarters for ASME meetings during the Jubilee.

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Highlights of the Jubilee program, in addition to the technical sessions scheduled for each weekday, include:

Sunday, Nov. 13 — Complimentary social hour at 5 p.m.

Monday, Nov. 14—President's luncheon. Afternoon tea dance.

Tuesday, Nov. 15—Diamond Jubilee social hour, preceding Jubilee dinner and pageant.

Wednesday, Nov. 16—Members and students luncheon. Special afternoon panel arranged by 75th Anniversary Committee.

Thursday, Nov. 17 — Honors luncheon. Social hour preceding Diamond Jubilee banquet.

Friday, Nov. 18—Division luncheons.

Presidential Suite for Ladies

The Presidential suite of the Congress hotel will be headquarters for ladies during the Jubilee with a continental breakfast "on the house" each morning. In addition to the business program and other general social events, these special features are planned for the ladies:

Tuesday, Nov. 15—Tour to Chicago's famous Museum of Science and Industry, with visit to Colleen Moore's internationally known Doll House conducted by Colleen Moore (Mrs. Homer Hargrave) in person. Also scheduled for that day is the annual luncheon at South Shore Country Club with Ivy Baker Priest, treasurer of the United States, as guest of honor.

Wednesday, Nov. 16—Tour of Board of Trade. Fur fashion show and tea at Pump Room of Ambassador East Hotel.

Thursday, Nov. 17—North Shore tour and lecture at Bahai Temple. Luncheon at Kungsholm restaurant followed by miniature opera, "Il Trovatore."

Friday, Nov. 18—Luncheon, Blackstone hotel.

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ASHAE Seeks Effect Of Walls on Comfort

The first phase of a new project to determine the effect of cold walls on heating and comfort from ceiling panel heating began Sept. 1 at the Cleveland, Ohio, Research Laboratory of the American Society of Heating and Air-Conditioning Engineers. This research is being conducted under the A.S.H.A.E. technical advisory committee on panel heating and cooling, with research supervisor Lester F. Schutrum of the A.S.H.A.E. Research Laboratory staff the engineer in charge.

In making this announcement Elmer R. Kaiser, A.S.H.A.E. director of research, said that the program will include tests with cold wall temperatures ranging from 30° F. to 60° F. while attempting to maintain 70° F. room temperature. Ceiling panel heating tests also will be made to determine if auxiliary heating is necessary along the cold wall and if occupants seated near windows will be comfortable.

Arrangements have been completed by Kaiser and Dudley W. Day, vice-president of Burgess-Manning Co., Chicago, for substantial support of this program by the licensees throughout the world of the Frenger Information Center, Bern, Switzerland.

The results of this study, it was pointed out by Kaiser, should provide design data which will be of great value in determining how much ceiling panel heating is needed and where it should be placed. This will be of great help to building designers, architects, engineers and contractors.

It's Just A Manner of Speaking

A soft Tongue may strike hard.
—Poor Richard's Almanack

Recipe: Blend Well--Score a Hit

The amazing new device which mechanically blended a bicycle wheel, alarm clocks and razor blades to successfully drop millions of anti-Communistic leaflets from giant balloons behind the Iron Curtain was invented and produced in the Minneapolis engineering laboratories of General Mills Mechanical Division.

The story of a "week-end creation" by two Minneapolis engineers which enabled General Mills to fill a rush request from Free Europe Committee, Inc., within 72 hours was uncovered in Minneapolis following the announcement from Germany that large quantities of propaganda have been delivered with amazing success through this new technique.

Several hundred of these unusual balloon units crossed the Iron Curtain last summer, all of them produced here by General Mills and delivered by the Minneapolis firm to the German launching sites.

Paul Yost and John Macgowan, the two General Mills engineers who developed the device capable of dropping 450 pounds of pamphlets, sometimes totalling 100,000, on a given target, performed the initial launchings in Germany.

The leaflet carrying device, attached to each 34-foot plastic balloon, has the appearance of a bicycle wheel. Each nine-pound packet of leaflets is suspended from a cord attached to the rim at regularly spaced points. An alarm clock initiates two slowly moving motor-powered razor blades around the rim of the wheel, cutting off cords holding packets of the leaflets at fixed intervals. "General Mills received the request from Free Europe Committee, Inc., on a Friday, asking if we could supply them with a balloon system capable of meeting their needs," explained Yost.

"John (Macgowan) and I were among those assigned the job of coming up with a leaflet carrying system. We worked steadily over the week-end and we had a working model manufactured by Monday."

Asked how they thought of the razor blade for cutting the leaflets loose, Yost told an interesting story:

"We didn't use razor blades at first. We used a small cannon which exploded the cord loose. We tried that in the original flights from Germany, but word got back to us that the Communists were using our cannon device for counter propaganda. They told residents behind the Iron Curtain that these cannon units were deadly. So we had to come up with something new. On the spot in Germany, we experimented until the razor blade idea clicked. We thought of a razor blade because we didn't have anything else."

The huge propaganda balloons are sent on their missions at an altitude of 25,000 feet.

A radio transmitter is used on some flights to provide altitude and locale information and verify the accuracy of pre-determined dropping of leaflets. As the leaflets are released, the balloon rises and this altitude is transmitted back to the launching engineers.

The flights have been so accurate one large pack of leaflets was pinpointed on a packed stadium.

Atomic Furnace to Have Safety Built In

The nuclear reactor, or atomic furnace for the United States' first full-scale atomic power plant for the generation of electricity will have "designed-in" safety factors that make it safe for locations near centers of population, it was reported in Geneva, Switzerland on Aug. 19.

This conclusion was drawn as the result of a technical paper presented at the International Conference on Peaceful Uses of Atomic Energy. The paper was written by Dr. S. Krasik, of the Westinghouse Electric Corporation's atomic power division, and Dr. A. Radkowsky, of the reactor development division, U. S. Atomic Energy Commission.

The new generating station, called the pressurized water reactor (PWR) will be located at Shippingport, Pa., about 25 airline miles west of Pittsburgh.

Westinghouse, under contract to the Atomic Energy Commission, is building the nuclear portion of the plant. Du-

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quesne Light Company, of Pittsburgh, is building the electric generating portion of the plant and will operate and maintain the entire station. The plant will be in operation, producing at least 60,000 kilowatts of electricity for homes and industry in 1957.

Dr. Krasik, who presented the technical paper Aug. 19, described experiments aimed at learning what will happen inside the plant's reactor when it begins producing power. One experiment, he reported, showed that scientists had successfully, designed a safety factor into the reactor which, along with other precautions, will enable it to resist any tendency to "run away"— that is, to get too hot and damage itself or nearby areas such as the adjacent community. This safety factor, he explained, is a "negative temperature coefficient" which means that as the temperature of the reactor increases, fissioning, or atom splitting, decreases.

The authors of the technical paper pointed out that a nuclear reactor having a negative temperature coefficient is inherently stable and therefore is safe for location near centers of population.

The paper also said that the safety factor can be governed by changing the proportions of the fuel, which is uranium, and water, which both moderates the speed of the atom splitting neutrons and cools the reactor.

Gathering such data was accomplished by constructing a "nuclear mockup" of the actual reactor to be used in the Shippingport plant. The mockup was brought to "criticality,"—that is, a self-sustained chain reaction of atom splitting was allowed to take place—by withdrawing the control rods. This is the same way the full-scale reactor will operate.

The mockup enabled scientists to predict with certainty the properties of the final operating power reactor. The criticality experiment was operated at a very low power rating so that the materials used in construction did not become radioactive. It was designed in such a way that it could be taken apart and reassembled in a variety of ways to study various fuel arrangements.

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Substitute Sought for Gas at Peak Loads

Development of processes for production of peak-load substitutes for natural gas has been one of the major problems of the utility gas industry. Propane-air and butane-air have proved useful, but are costly, so the more economical high-Btu oil gas processes have been used for production of increasingly large increments of peak and winter base loads.

However, the making of a high-Btu oil gas as a substitute for natural gas is a rigorous problem in that natural gas is largely methane, while in high-Btu oil gas processes the complete range of paraffins, olefins and aromatics, are produced. The tars and carbon are removed in the condensing system or left behind in the set, but the remainder of the galaxy of hydrocarbons is carried into the raw gas stream, where the olefins (illuminants) are particularly objectionable because they tend toward yellow-tipping and soot deposition during combustion.

Hydrogenation of high-Btu oil gases at relatively low temperatures would result in a reduction in olefins and an increase in paraffins, primarily methane and ethane. Further, hydrogen in the gases could be used for this purpose.

Results of a study, sponsored by the American Gas Association at the Institute of Gas Technology, Chicago, to demonstrate the improvement autohydrogenation would make in the substitutability of oil gases for natural gas, have been published in IGT Research Bulletin No. 25, "Autohydrogenation of Oil Gases," by H. A. Dirksen, H. R. Linden and E. S. Pettyjohn. It covers the influence of catalyst type, operating conditions, feed gas composition, and purification techniques, on the conversion of olefins and diolefins in typical high-Btu oil gases to paraffins, utilizing the hydrogen in the gas.

Weighty Wood

The heaviest known wood in the world, according to the National Lumber Manufacturers Association, is black ironwood, native to the West Indies and the Florida Keys. The lightest wood is believed to be tano, found in Siam and the Malayan Peninsula.

Masonry Schools

(Continued from Page 4)

The long range economy and advantages of this type of construction are apparent:

1. All external loads are received by the structural skeleton of the building as either compressive or shear stresses and tensile and bending stresses are either eliminated or kept to the absolute minimum. Since clay masonry develops its greatest strengths when loaded in this manner, it was found structurally feasible to use relatively thin 6-inch brick walls, avoiding much of the heavy mass of masonry normally required in buildings of wall-bearing construction.

This particular design is based on the use of the "SCR brick,"* the performance of which has been thoroughly tested both in the laboratory and in the field over the past 3 years. For example, "SCR brick" walls have compressive strengths on the order of 100 kips per lineal foot of wall and racking resistances (diagonal tension and shear strength) of over 8 kips per lineal foot of wall.

2. Auxiliary supporting members, such as columns or piers are unnecessary, as are their connections and fittings.

3. The interior finish suggested in this design is exposed clay masonry, the units used for construction being selected for required light reflectivity in the classrooms and the necessary resistance to wear and vandalism in washrooms and corridors. Such materials require little maintenance. The small amount of exterior wall would, of course, be furred. As another step towards economy in construction and maintenance, trim and millwork would be kept to a minimum.

4. The structural clay masonry partitions separating the classrooms are effective in sound isolation. Where they have been used in buildings of this type, they have afforded a degree of privacy not economically attainable by using many other types of partitions.

5. Such partitions are highly fire-resistant. Based on standard fire tests at Ohio State University, the ultimate fire resistance of "SCR brick" walls, for example, is 2½ hours.

6. The dimensional changes of clay masonry walls under conditions of varying temperature and moisture are sufficiently small as to eliminate the possibility of cracking from these causes. Special precautions against such cracking are, therefore, not necessary.

7. Combinations of different structural materials are kept to a minimum, therefore minimizing, if not eliminating entirely the likelihood of masonry wall cracking, usually associated with differential movements of materials with unlike coefficients of dimensional change.

*Reg. TM, Pat. Pending, Structural Clay Products Research Foundation

Figure 3. The not unconventional exterior

The heating and ventilation system used in this design study is of the oil-fired forced hot air type in which both hot and tempered air are distributed under pressure through a duct system in the space over the central corridor and introduced into the individual rooms through directional louvers near the ceiling in the corridor walls. Air return is effected through grills in the classroom doors, using the corridor itself as a return duct.

Such a system, while not as closely controllable as more elaborate and expensive types, is felt to be satisfactory from previous experience. Such simple systems have been observed in action and have been found perfectly acceptable by those communities for which they have been provided. It is an economical and simple system to install, operate and maintain and could easily be the wisest choice of an architect working with limited funds. Other types of heating which

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might be employed would depend primarily upon the relative utility versus cost and the amount of money available.

The lighting system should be designed to provide adequate light for classroom tasks without dependence on difficult-to-control natural light. It is an observed fact that artificial light is used in the classrooms during the day regardless of the availability of natural light. The very fact that artificial lighting systems have been developed to their present point of refinement and efficiency has made possible a school of the type here illustrated. This approach has, by permitting deeper classrooms, allowed a significant reduction in the length of the exposed perimeter of the building and, in addition to lower original costs, can be expected to result in substantial economies in the cost of heating and maintenance, besides providing a more comfortable physical environment for teachers and pupils.

Based on July, 1954 material and labor costs in the Chicago area, it is estimated that a structure of this size and type could be erected for $8.35 per sq. foot unfurnished but equipped with the necessary mechanical services. Of this $8.35, $6.10 represents the cost of the structure itself, the remaining $2.25 being the cost of plumbing, electrical and heating facilities.

I suspect that many of you are wondering about building code acceptance of 6-inch masonry walls used in this manner. By and large, most modern and up-to-date codes permit the use of such walls for the exterior of one-story single family residences and private garages. Since the "SCR brick" was introduced almost 3 years ago, over 15,000 homes have been built in all areas of the country using this unit. Based on successful performance in such structures and extensive laboratory test to determine physical properties, steps are now being taken by many codes to expand the use of such 6-inch masonry walls to all one-story construction, including schools such as we have been discussing.

Most modern building codes today will permit 6-inch load-bearing partitions. A typical requirement is that the thickness of bearing partitions shall be such as to support their vertical loads without exceeding the allowable stresses for masonry of the type being used but not less in thickness than required by the lateral support provisions. The typical lateral support requirement for solid masonry walls, such as "SCR brick," is that such walls be supported at right angles to the wall face, either horizontally or vertically, at intervals not exceeding 10 feet in height without pilasters or other vertical supports. In fact, tests and stress calculations indicate that such walls can actually be built 12 feet in height and safely carry the design loads without danger of buckling.

Therefore, we can say that, in general, no particular difficulty is anticipated in obtaining local code acceptance for this type of school construction. Ample test data are available, backed up with field performance experience, to justify its acceptance by progressive building code officials.

The method of school construction which has been suggested is described in Structural Clay Products Research Foundation Research Report No. 3,

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"Comparative Costs of Low-Cost Schools." It is not necessarily unique; essentially all of the features of which it is composed have been used before — some very successfully in various parts of the country. In external appearance the building is certainly not unconventional (Fig. 3), in fact it is consistent with current school design practice. It does not advertise its structural type nor its economy and should fit comfortably into any community.

Nor is it suggested that this design concept is the only solution to the problem of low-cost school design. There are currently a great many excellent clay masonry school designs being built or just completed throughout the country which do not make use of this particular design concept, in its entirety, but which can be considered as being low-cost and meeting the particular needs of the communities which they are serving. Individual school plants, to be efficient, must be designed for a specific site and function. It is for that reason, perhaps more than any other, that prototype designs or stock plans are not the answer to low-cost schools.

However, it is an established fact that a clay masonry school, when efficiently designed so as to make full use of the structural properties of brick and tile, is highly economical — both in initial cost and annual maintenance. For those of you in the school designing field, this design concept is commended to your thoughtful attention.

'Research for Profit' Is Theme of Meeting

"Research for Profit" will be the theme of an industrial research conference sponsored by Armour Research Foundation of Illinois Institute of Technology, Chicago, on April 18-20, 1956.

The meeting, titled the National Industrial Research Conference, will highlight a series of 12 technical meetings planned as part of the Foundation's 20th anniversary in 1956.

A number of leading industrialists and research directors will participate in the three-day program designed to guide industry in the administration of more profitable research.

Twelve papers will be presented at the conference, which will be held on the Illinois Tech campus.

Western Society's New-Type Meetings Are One Big Success

The first of the Western Society's new-type meeting, on Sept. 27, was a huge success. Nearly 300 persons attended.

Under the new system, several technical sessions are held simultaneously. Each month, however, there is only one evening meeting.

At the first meeting, to set the pattern, the free cocktail hour lasted until 6:15 p.m. when dinner was served. The dinner was carried to a fitting end by George Connor who coffee-talked about "Those Big Bad Bears." Connor is co-captain of the professional football team, the Chicago Bears.

At 8 p.m. the technical sessions began.

Session 1 featured Merton E. Paddleford, electrical engineer with the Commonwealth Edison Company, speaking on "Operation Teapot." The talk gave some results of atomic bomb tests on electric utility installations.

In Session 2, E. J. Stankiewicz, chief structural engineer, and partner in the firm of Sargent & Lundy, spoke on "High Stacks," covering the design and comparative costs of steel, brick, and concrete stacks.

"Controlling the Leakage from Herscher" was the title of the paper given in Session 3. O. C. Davis, superintendent of storage, Natural Gas Storage Company of Illinois was the speaker.

Philip L. Coleman, partner in the firm of Duff & Phelps, is this year's chairman of the Western Society's Program Committee.

Industrial Designers To Review Problems

What is industrial design—and how can it be used most effectively?

These are some of the problems to be reviewed in a two-day symposium on industrial design to be held Nov. 10 and 11 at Illinois Institute of Technology, Chicago.

The symposium is being staged in conjunction with the second annual Chicago Area Industrial Design exhibit to be held Nov. 7 through 18 at Illinois Tech's new Architecture-Planning-Design building, 10 W. 34th St.

Sponsored by the Chicago chapters of the Society of Industrial Design and the Industrial Design Institute, the exhibit will feature mass-produced products designed by members of the two organizations. Items ranging from household appliances to farm equipment will be displayed in the exhibit.

Purpose of the industrial design symposium is to provide industry with information on the proper use of design, according to the chairman, Jean Reinecke, president of the Chicago design firm of Reinecke and Associates.

Leading designers will meet with businessmen and industrialists to discuss design problems from 9 a. m. to 4 p. m. both days at IIT's Commons building lounge, 3200 S. Wabash Ave.

Assisting Reinecke with arrangements for the symposium are: James Hvale, chief designer of Ekco Products Co. and president of the Chicago chapter of IDI; Shelby M. Croucher, of Reinecke and Associates; William Goldsmith, of Dave Chapman Associates, and Jack Morgan, of Morgan and Associates.

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to

Julius L. Hecht

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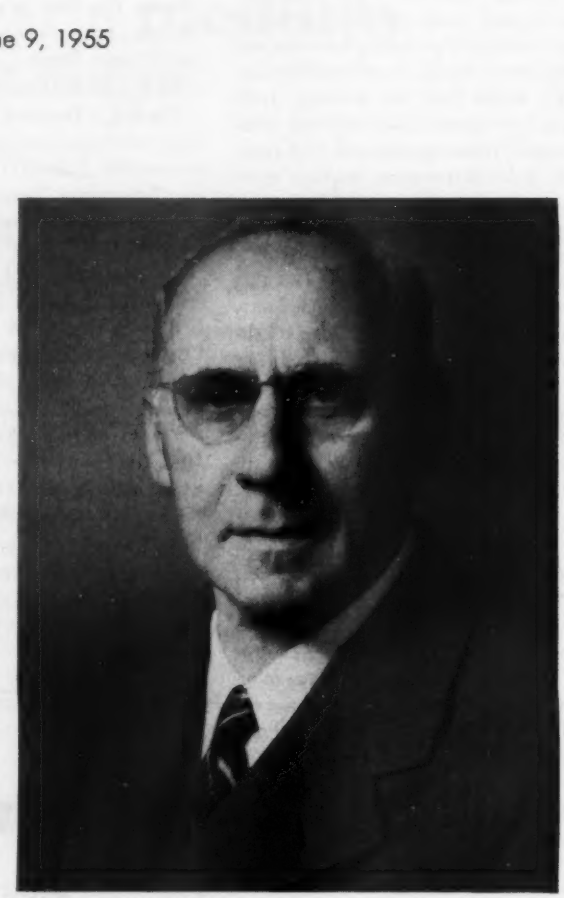

The members of the Board of Direction and the Officers of Western Society of Engineers wish to express their deep affection and admiration for JULIUS L. HECHT, Past President and Honorary Member, who died on Thursday, June 9, 1955. We, his Associates, will feel keenly the loss of his inspiration and counsel.

Mr. Hecht, who had retired as Vice President in Charge of Operations of Public Service Company of Northern Illinois, was an outstanding engineer and leader in the utility industry. He was nationally known for his pioneering efforts, particularly in introducing the use of metal clad switchgear in this country. Chicago has lost an outstanding engineer. Mr. Hecht was noted for his kindly interest in the welfare of his fellow employes, and for his constant efforts to better their working conditions.

He had maintained an active interest in Western Society affairs over many years. His character, his outstanding ability and his engaging personal qualities endeared him to his associates at Western Society and won for him their highest respect.

RESOLVED: That this Memorial be recorded in the minutes of this meeting and that the Secretary of Western Society of Engineers send a copy thereof to Mrs. Hecht as a token of our deepest sympathy.

Signed: A. Reichmann; F. H. Lane

Job Studies

(Continued from Page 8)

1. One of these factors is the WORK PLACE, with particular attention as to whether all hand-holding has been eliminated through the use of jigs, fixtures, etc.; whether both hands are doing useful work throughout the job, for better work efficiency, and so that one hand is not free to get into the point-of-operation or other potential injury exposure; whether gravity-feed hoppers or drop-delivery chutes can be used; and whether all necessary facilities for the job have been provided in the proper work area. Is illumination adequate, are aisles and exits clear, are floors, stairs, and ramps in good condition?

2. Another factor to be considered is the JOB LAYOUT. Is it arranged so that aisles are wide enough; are materials and machines arranged for smooth production flow, so there is a minimum of handling and back-tracking; is layout arranged so that the number of handlings and the distances traveled are at a minimum; and so that all available space is being used, without waste space?

3. Important job improvements have been made by questioning the MATERIALS. That is, can better, less hazardous, less expensive, or more suitable materials be substituted (as in the example above regarding use of paraffin); are the materials specifications entirely clear and definite; have defects and scrap been reduced to a minimum; and can the scrap from this job be used for another product?

Are any exposures to toxic, corrosive, or flammable substances adequately safeguarded? Can safety or production be improved by the use of hoists, conveyors, hand or lift trucks, tongs, etc.; and are those in use adequate and in good condition?

4. EQUIPMENT and TOOLS are important factors. That is, are suitable equipment and tools available; have they been supplied to all operators who require them; have they been properly pre-positioned to facilitate efficient work; and how about the use of gauges, jigs, and fixtures.

Are equipment and tools adequate for the job; are they properly used and in good condition? Can better guards be provided to prevent getting hands into the point-of-operation, power transmission, or other moving parts; is there unsafe starting, stopping, or adjusting of machines; is there any exposure to pinch points, projections, or flying pieces; are suspended parts equipped with safety chains so they cannot fall if normal support fails; etc.

5. Important job improvements have been made by considering individual MACHINES. That is, is each one operating at maximum capacity; is each one in good operating condition, and are they properly serviced and maintained regularly; is the machine used the best one for this operation; should a special "set-up man," or the operator, make all the set-ups; can use be made of the machine's or operator's idle time; and so on.

6. SAFETY is another factor, because accidents, of course, result in waste of man-power, machines, and materials. We should be sure to consider whether the method being used is the safest and easiest, whether the operator clearly understands all safety rules and precautions, whether adequate and effective safety equipment and protective clothing has been provided, and so on. Are there any exposures or hazards that may cause injury?

7. Another factor is HOUSEKEEPING. That is, has everything that is unnecessary in the work area been done away with; is "junk" taking up space that could be used for additional operators, machines, benches, and operations; are working and storage areas clean and orderly; are all necessary things in their proper places; and is good shop housekeeping continually maintained, so as to reduce delays, waste, and accidents?

8. Another important factor which should be questioned is PRODUCT DESIGN. Would a slight change in design save much time or material, or reduce the accident exposure; are the tolerances and finish that are specified essential, and if not can they be relaxed to simplify the operations; and could quality of the product be improved by a change in design or specifications?

Sometimes a possible improvement that might be overlooked when applying our six questions to each detail will be disclosed by questioning these eight job factors in this way. In other words, questioning the eight factors gives us a double-check on application of the six questions to each detail.

Step III

After the questioning of job details and factors has been completed, as described above for Step II, the information resulting from this questioning will then serve as the basis for developing the improved job method by applying Step III.

Step III consists of four parts, which should be applied in the following sequence:

1. Eliminate unnecessary details.
2. Combine details when practical.
3. Rearrange details for better sequence.
4. Simplify all necessary details, to make the work easier and safer:
   a. Pre-position materials, tools, and equipment at the best places in the proper work area.
   b. Use gravity-feed hoppers and drop-delivery chutes.
   c. Let both hands do useful work.
   d. Use jigs and fixtures instead of hands for holding work.

As explained above, when the six

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questions were applied to each detail of the job in Step II, some kind of an answer was written down after each detail. In cases where no ideas were developed from the first two questions this answer was at least a "better way," as a result of applying the sixth question. In Step III these answers are now possibilities for improving the present method, and are now to be boiled down into a new method.

The procedure to be followed in applying Step III is illustrated in the following chart:

Step II Question		Step III Develop
Why?	}	
What?	}	Eliminate
Where?	}	
When?	}	Combine
Who?	}	Rearrange
How?	}	Simplify

Using this chart, the first point in Step III is to eliminate all unnecessary details. Those details where we noted ideas as a result of applying the first two questions, "Why" and "What" (see chart); are the details which we may be able to eliminate as being unnecessary, provided the end result of their purpose can be accomplished more effectively in some other way, by applying the clue which we noted (in Step II) after those details. At this point we should consider first of all, whether we can make the changes which may enable us to eliminate these details.

After determining what details can be eliminated, the second point in Step III (see chart) is to combine details wherever possible. To do this we should check those details where we noted clues as the result of applying the third, fourth, and fifth questions of "Where," "When," and "Who." We should consider with regard to these details whether they can be combined with other details of this or other jobs, so as to reduce hazards, or unnecessary transportations, storages, delays, handlings, and inspections between operations; and thereby minimize the inherent accident exposure and improve job efficiency. There may be various ways in which the present method can be improved; and the essential basic requirements of the operation having been established in Step II, the making of different combinations at this point may help us to see which grouping best meets these requirements. All the possibilities developed by our questioning should be considered, so that the best possible improved method may result.

The third point in Step III is to rearrange details for better sequence (see chart). Here we should again review the details we have not been able to combine, and where we noted ideas as the result of asking "Where," "When," and "Who." We should now specifically try to determine whether these details cannot be rearranged for better sequence, so as to reduce hazards, or unnecessary transportations, storages, delays, handlings, and back-tracking; and thereby further reduce inherent accident exposures, and improve job efficiency.

The fourth point in Step III is to simplify all necessary details. Having studied the over-all picture, and made the major possible changes in method, we are now ready to study the smaller work details; so they may be simplified by determining whether there is a "better way" of performing those details which have not been eliminated as unnecessary.

To do this, we should consider for each of these whether it can be made safer and easier by the pre-positioning of materials, tools, and equipment at the best places in the work area; whether gravity-feed hoppers and drop-delivery chutes can be used; whether both hands are now being used to do useful work, and if not, whether these details can be revised so that both hands will do useful work; and also whether jigs and fixtures can be used on these details instead of hands for holding work.

Such questions as:

Why is it done this way?

Why must it be done by hand if quantities are being produced?

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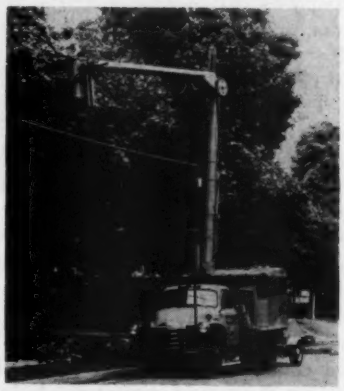

Why cannot a standard machine be used?

Can it be done better with different equipment or layout?

Why cannot a standard form be used?

Why must multiple copies be prepared?

Is there any other way to do it?

will help us to apply the generating suggestiveness of our questioning attitude in finding a "better way" in this step.

It is important to work out our ideas with others, and in this connection oftentimes the operator or supervisor will be able to cooperate in giving us helpful ideas about simplifications or other changes that will better protect the worker against hazards, or improve efficiency of the operation.

It is desirable that a detailed breakdown of the new method be made, because this enables us to clarify our thinking, see the improved activity as a whole, and arrange the best sequence for making improvements.

It also serves as a permanent record, and when compared with the present method breakdown it shows the simplifications and other improvements accomplished, which are important in getting management's approval for instituting our changes.

Step IV

Step IV is to apply the new method; which would include getting the approval of management, supervisors, and other necessary approvals; and then following through to see that the new method is placed in effect to accomplish the reduced accident exposure, and more efficient processing, which our study may show would result from our changes.

It is advisable to write up a proposal to management on the new method, which will provide a concise and clear record of the improvements it will make in the operation for greater safety, or improved efficiency; which are usually inter-related. This should include any advantages to be gained by the changes we may have in mind, such as elimination of hazards, savings in man-hours, machine-hours, conservation of space, and so on, as a means of selling management, supervisors, and others who may be affected.

If our improvement combines safety with better production efficiency, the latter should help us secure necessary approvals for the safety engineer's objective of reduced accident exposures.

Summary

A knowledge of the above principles should be helpful to the safety engineer in analyzing job procedures, even where he does not make a detailed job study. It may appear that making a job study is complex, but so is the question of eliminating inherent hazards in some operations. It should be recognized that the principles of the plan outlined have been widely and successfully used in industry for many years, and have eliminated many accident exposures, and greatly improved production efficiency on many operations.

For successful use it should be applied as described; but even if some short-cuts are taken, the value of the questioning attitude about the job factors and details can be of great help to safety engineers in eliminating hazards which otherwise might be difficult to overcome. Past experience with the plan in industry has shown that the investment in time involved has paid off many times over. There is only one way to test its value, and that is to give it a fair trial.

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Automation Exhibition To Hold 'Brain Clinic'

Chicago will have a "brain" clinic soon but without neurologists or psychiatrists. The "brains" will be of the electronic variety—analog and digital computers. A lecture course featuring demonstrations and typical applications of the different computers will be given at the clinic, which will be held Nov. 15 to 17. The clinic will be part of the Second International Automation Exposition to be run Nov. 14 to 17 at the Navy Pier, Chicago. Those invited to attend are from top management of companies interested in computers: management engineers, physicists and chemists, instrument and automation engineers, etc.

The industrial potentialities of automation appear to be staggering in themselves. The equipment on display at the Second International Automation Exposition will permit studying the possibilities of applying automation in the office and plant operations. This show has been planned to give a basic knowledge of Automation in concentrated form.

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C-3823 MFG. EXEC. ME Age: 44-48. 5 plus yrs. exp. in fabrication of food, dairy, or liquid machy. as plt. mgr. or wks. mgr. Know: Fabr. light gauge stainless steel. Duties: resp. for manuf. light machy. & eqpt. for food, dairy, or bottling industries. For Mfr. of light machy. Sal: $12,000-$14,000. Loc: Iowa. Employer will neg. fee.

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News and Notes

The Research Fund of the American Society of Tool Engineers has contracted with Crerar Library to undertake a major library research project in metal cutting. In the words of a news release issued by the ASTE Research Fund:

"Two highly significant Metal Cutting Research developments have been announced by the Research Fund of the American Society of Tool Engineers. The first concerns the awarding of a $30,000 contract to The John Crerar Library of Chicago, and the second concerns the formation of a sub-committee for the establishment of machinability test standards in the metal industry. The Crerar contract stipulates that the Library will compile a Metal Cutting Bibliography with adequate abstracts of all available information from 1943 to date. It will take Crerar approximately eighteen months to complete the bibliography. A hint of the invasion of Automation in the literary field is contained in a provision which states that all material is to be compiled in a manner allowing for the possible use of electronic machine searching equipment in the future . . .

"Compilation of the Bibliography and establishment of the Test Standards Sub-Committee are the first steps in ASTE's comprehensive Metal Cutting Research Project announced last January. Other phases of the overall program, which is expected to require a minimum of five years to complete, will include: a survey of industry scientists, laboratories and educational institutions conducting research in this field; a critical evaluation of both the bibliography and surveys: and finally development of proposals for continuing metal cutting research in the areas most valuable to industry."

In Crerar Library's part of this program, the world technical literature will be surveyed to bring together a comprehensive bibliography of all publications on metal cutting which have appeared since the closing date of a bibliography on the subject published by the American Society of Mechanical Engineers in 1943. Every aspect of chip-producing metal cutting will be reviewed, including research and theory, development and industrial application.

All books, reports, journal articles and other publications except those under government security classification will be abstracted and organized into categories under turning, milling, sawing, shaping, planing, drilling, broaching, grinding, boring and other special operations. Each article will also be individually classified for possible future machine storage and retrieval procedures, and the final report will be thoroughly indexed by author and subject.

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Cavalcade is Feature Of A.S.M.E. Meeting

The annual meeting of the American Society of Mechanical Engineers being held in Chicago, Ill., Nov. 13-18, will be highlighted by the Diamond Jubilee Cavalcade, Tuesday evening, Nov. 15, at the Conrad Hilton Hotel. A. B. Openshaw, MWSE, of Combustion Engineering, Inc., and entertainment chairman for the meeting, has arranged with Howard Lanin Management, producers of industrial entertainment, to present the show in celebration of the 75th anniversary of A.S.M.E.

The Diamond Jubilee Cavalcade, which promises to be a high spot in the history of the society's meetings, will take the form of a salute from show business to A.S.M.E. in particular and engineering in general. Decade by decade, A.S.M.E.'s history and prominent personalities will pass in review, each receiving its accolade from a galaxy of Broadway stars in song, dance and drama.

Piloting the star-studded cast will be Roger Price as narrator, one of show business' top comedians, who with Myron A. Lanin, executive producer, is writing the script of the elaborate production. Price, a tall, shambling, bespectacled "lecturer," whose droll monologues illustrated with clever cartoons, have won him a unique and enviable place in the entertainment world, is a happy choice for Cavalcade. Having studied engineering early in his career, Price's pseudo-scientific style coupled with his skill as a master of ceremonies assures a memorable evening of fun for the one thousand delegates expected to attend the 75th anniversary of A.S.M.E. from all parts of the United States.

Here's the Difference

Puzzled about the difference between hardwoods and softwoods? Generally, hardwoods come from broad-leaved trees. Most softwoods come from evergreens.

Means of Uranium Purification Told

Four methods for the purification and recovery of uranium and plutonium and other radioactive products from used nuclear fuel were described Aug. 19 at the United Nations' International Conference on Peaceful Uses of Atomic Energy by Dr. Stephen Lawroski, director of the Chemical Engineering Division of Argonne National Laboratory.

A very substantial amount of the initial research and development work on these methods had been performed at Argonne National Laboratory which, in 1944, also initiated the first studies of the solvent extraction method which is now widely used for the recovery of nuclear fuel. Details of this process are being reported in another presentation at the Conference in Geneva.

The consumption of nuclear fuels differs from fossil fuels in that a large fraction of the fuel is not consumed in the "burning" process. Consequently, several cycles of burn-up and intervening recovery operations are necessary in order to obtain a complete utilization of the fuel. A separations process for the recovery and purification of the unused fuel must, therefore, be capable of achieving high yields at a low cost. In addition, the process must accomplish this as rapidly as possible in order to avoid the need of a large inventory of fissionable material.

Many different separations methods for reactor fuel recovery and purification are being investigated at Argonne National Laboratory and at other Atomic Energy Commission installations. These methods are in various stages of study or development in order to permit the selection of the best reprocessing method for the various reactors being developed in the country.

The four separations methods described by Dr. Lawroski are (1) precipitation, (2) ion exchange, (3) fractional distillation, and (4) pyrometallurgical or high temperature processes.

The oldest and most widely used are the precipitation methods which were conceived and developed in 1943 at the Manhattan Engineer District's Metallurgical Laboratory at The University of Chicago. The most important example is the bismuth phosphate process. It has been the most thoroughly investigated and developed of all of the precipitation methods and has resulted in the successful large-scale use of the process to recover and purify plutonium from irradiated natural uranium. The bismuth phosphate process, the details of which were described at the Conference, was worked out before there was more than a small fraction of an ounce of plutonium available.

At Argonne, and elsewhere in the atomic energy program, ion exchange methods have been extensively used in the laboratory to make very difficult separations. The most outstanding examples have been the isolation and concentration of individual transuranium elements and, similarly, of individual fission products of the rare earth group of elements.

One of the most important larger-scale applications of ion exchange methods has been in auxiliary steps with other basic types of separations processes. Ion exchange has proved to be a very effective method for concentrating solutions of plutonium, U^{235}, or U^{233}.

The use of ion exchange methods for separating and recovering plutonium from irradiated reactor fuel has been highly successful in laboratory and in small-scale pilot plant tests. The recent development of resins which are more stable against chemical and radiation damage will undoubtedly lead to greater efforts to utilize this method for large scale separations.

The potentiality of fractional distillation for the recovery of nuclear fuel has always appealed to chemists and chemical engineers working on separations problems in the atomic energy program and since 1948, a preponderance of work on this method has been done by Argonne National Laboratory. An important reason for this attitude has been the fact that the basic principles and technology of fractional distillation have been so well developed. Another significant influence has been the economically attractive possibility of recovering uranium directly in a form (uranium hexa-

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fluoride) which can be accepted without alteration at a gaseous diffusion enrichment plant.

The volatility of uranium hexafluoride is substantial at ordinary temperatures. From a separations standpoint, it is very encouraging to find that the fluoride compounds of the fission products vaporize at quite different temperatures than does uranium hexafluoride. With few exceptions, the fission product fluorides are less volatile and for this reason, substantial purification is possible even with a crude distillation. Complete separation requires more efficient distillation.

In the fractional distillation of irradiated nuclear fuel, the plutonium remains in the non-volatile residue. The recovery of the plutonium from the residue can be accomplished by aqueous processes such as solvent extraction.

The development of reactors for the large-scale production of electricity on a competitive basis will necessitate the simultaneous development of improved fuel recovery methods. Therefore, research and development work on the pyrometallurgical or so-called high temperature processes has been undertaken. In such a process the irradiated uranium or a mixture of uranium and plutonium are processed in the metallic state. This is done by heating the metal to a temperature of 2200°F. in a specially shielded and equipped furnace. The removal of fission products is obtained by methods similar to many used in purification steps in the steel industry. The furnace is tapped to give a stream of purified molten metal suitable for casting into new fuel elements for the nuclear reactor.

The experimental results obtained to date are very encouraging for the development of one or more high temperature processes suitable for the recovery of short-cooled highly-irradiated fuels. Moreover, these methods may enable the recovery of other valuable metals used in fuel element fabrication.

The recovery and purification of nuclear fuels is regarded as a very essential step in the over-all program of obtaining useful energy from the fission process. Therefore, the successful development of these methods is extremely important in the ultimate goal of producing electric power from nuclear energy on a basis competitive with that produced from fossil fuels.

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Col. Fletcher Directs ASTE Programs

Col. Leslie S. Fletcher, research director of the American Society of Tool Engineers' Research Fund, has been named program director for the Society's 1956 annual meeting technical sessions. The sessions will be held in conjunction with the ASTE Industrial Exposition which is being held in Chicago's International Amphitheater, March 19-23.

The Society's National Program Committee, headed by Philip R. Marsilius, vice-president, Producto Machine Co. of Bridgeport, Conn., is assembling a significant series of technical sessions in Society history. Each session topic has been selected for its importance to the technological progress of the country, Marsilius said.

Col. Fletcher reported to the committee that the line-up of speakers and timetable of the 1956 sessions is practically complete. Top industrial executives and engineers will reveal and discuss the latest advances in their individual fields. Panel discussions are also planned on many of the most important subjects in order to present all viewpoints and phases of their developments.

Needles Heads ASCE

Following a mail ballot among its more than 38,000 members, the American Society of Civil Engineers has announced at its headquarters in New York the election as president of Enoch R. Needles of that city, senior partner of Howard, Needles, Tammen & Bergendoff. Needles, installed Oct. 26 at the Society's national convention in New York, will serve one year. He succeeded William Roy Glidden, of Richmond, Assistant Chief Engineer of the Virginia Department of Highways.

Actions Speak

Well done is better than well said.
—Poor Richard's Almanack

Reviews of Technical Books

Machine Design

Principles of Machine Design, by Samuel J. Berard, Everett O. Waters and Charles W. Phelps, The Ronald Press Company, New York, N. Y., 1955, 534 pages. Price $7.50.

This textbook has been designed for a one-year course for Mechanical Engineering students. It is written to develop rational and consistent methods of design applied to the more common elements of machine construction. Careful thought had been given to the relative importance of theory and conventional practice.

The text covers all aspects of the subject matter including: screws and bolts; pins; keys; welding processes and design; shafting; couplings; clutches; sliding and rolling bearings; belt and chain drives; parallel-shaft, bevel, worm and screw gearing; cams; linkages; springs; brakes; curved beams.

B.A.W., W.S.E.

Aircraft Gas Turbines

Gas Turbines for Aircraft, by Ivan H. Driggs and Otis E. Lancaster, The Ronald Press Company, New York, N. Y., 1955. 349 pages. Price $10.00.

This book gives comprehensive coverage in a field undergoing tremendous development. The authors, Ivan H. Driggs, Chief Scientist with the U. S. Naval Air Development Center, and Otis E. Lancaster, Assistant Director, Research Division, Bureau of Aeronautics, Department of the Navy, have figured importantly in the dramatic evolution of turbine-powered aircraft.

This is the only book which outlines a method for obtaining the complete performance of a gas turbine, starting with the tested performance of the parameters. The book gives a simple method for matching the compressor and turbine so that the performance at any operating point may be determined. It discusses in detail the control problems of turbojet and turboprop engines. It provides a quick method of estimating aircraft performance when the engines are installed.

This book, encyclopedic in scope, is a reference volume for aeronautical engineers, mechanical engineers and all others concerned with the design and performance of gas turbine power plants in aircraft.

B.A.W., W.S.E.

Hydraulic Control

Hydraulic Operation and Control of Machines, by Ian McNeil, The Ronald Press Company, New York, N. Y., 1955. 324 pages. Price $7.50.

An up-to-date handbook and reference book for engineers concerned with hydraulic applications pertaining to machine operation and control.

The material is presented so as to give practical assistance for the immediate solution of problems encountered in the field. Among the subjects covered are basic theoretical considerations, hydraulic pumps and motors, valves and hydraulic circuits, hydrokinetic power transmission, the aeronautical and marine uses of hydraulics and the operation, care and maintenance of hydraulic plants and equipment.

The material is well illustrated and brings together in one volume established methods, new developments and future trends. This material should be indispensable to those working in the field of hydraulic power.

J.C.S.

Engineering Mechanics

Engineering Mechanics, by Archie Higdon and William B. Stiles, Prentice-Hall, Inc., New York, 2nd edition, 1955. 585 pages.

Here is a second edition that has been remarkably reorganized in part, improved and enlarged from its first edition. The authors say that the careful consideration of the many helpful suggestions from teachers who used the first edition played a prime role in the preparation of the second edition.

The chapters on resultants and equilibrium have been reorganized to reduce the types of force systems discussed separately.

A section on the location of centroids and the evaluation of moments of inertia has been added. An article on the use of Mohr's Circle for principal moments of inertia of areas has also been included in the text. The chapter on kinematics has been greatly revised to provide a more direct approach to this material.

A new chapter on the use of vertical work in equilibrium has been included. About 40% of the problems in the text were replaced and the total number increased.

B.A.W., W.S.E.

Chicago Centers Rehabilitate Many

Over 2,500 seriously injured industrial workers, many with amputated limbs or with paralysis from spinal cord accidents, have been returned to profitable jobs after rehabilitation at Liberty Mutual Insurance Company's unique rehabilitation centers in Boston and Chicago, it was announced recently in Boston, Mass., by Stanwood L. Hanson, Liberty executive, in the annual report on the centers' operations.

As the nation's number one carrier of workmen's compensation insurance and the largest mutual casualty insurance company in the country, Liberty Mutual annually handles thousands of industrial accident cases of its policyholders.

Of 2,866 cases that have undergone rehabilitation care from 1943, when the pioneer Boston center was established, through the end of 1954, 85%, or 2.442 have been definitely improved by the treatment. Of this number, an impressive 82.3%, or 2,010 have actually returned to work.

At Liberty Mutual's smaller Chicago rehabilitation center, founded in 1951, of the 730 cases that have undergone rehabilitation, 659 of the cases were definitely improved by treatment and of these 540, or 81.9%, have actually returned to work.

"We are extremely happy to be able to report these successful results," Hanson said. "These figures underscore the vital contribution modern rehabilitation treatment can make to the nation's production force and to society in general. Most important accomplishment in these cases is the self-respect which comes from the return of independent earning power," Hanson said.

"It is a dramatic instance of human gain coinciding with business gain," Hanson added. Illustrating this point in terms of one of the most severe types of disability, paraplegia (partial paralysis from spinal cord injury) which generally resulted in death up until 15 years ago, Hanson revealed that Liberty Mutual has undertaken rehabilitation on 85 paraplegia cases and completed work on 66. Of these, 48 have returned to work. Without rehabilitation, the anticipated cost of the 66 completed cases would have come to about $6,812,509. As the result of rehabilitation, the cost of these cases was reduced to $3,683,025, a gross saving of $3,129,484. The cost of providing rehabilitation was $676,-771, which meant a net saving through rehabilitation of $2,452,713.

The Liberty Mutual report showed that of the 2,866 cases rehabilitated in Boston some 449 of them were women. Average age of male patients was 44.4 years and of women 43 years. Of the total of 251 cases completed and closed out during 1954, 232 were improved to the point where they could work again.

The average treatment period of all cases including examinations totalled 41.5 days. The average length of time from injury or initial surgery to time of admission to the rehabilitation center was 6.9 months. Comparable figures for the smaller Chicago center were nearly identical to these except for the average treatment period, which was 28.2 days, reflecting the fact that this center does not handle the paraplegia cases and in general does not handle as many of the more severe injury cases as Boston does.

All patients remained at the centers five days a week, for a full daily program. Lunches are provided for all patients and room and board at nearby hotels or rooming houses for out of town patients. The average cost per case during the last fiscal year was approximately $594, Hanson stated. Liberty Mutual is the only insurance company in the nation to establish industrial rehabilitation centers so far.

Hanson demonstrated that the dollar savings in compensation benefits alone are substantial, without going into the inestimable economic value of restoring a productive worker to industry, a taxpayer to the country and a breadwinner to the family. Thus, a survey of typical injury cases among the patients at the Boston center indicated an average estimated saving in compensation benefits alone of slightly more than $1,000 based upon effective reduction of actual lost time from work or lessening of the permanent loss of function of the injured part.

Hanson asserted that the most im-

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portant single development of the year in Liberty Mutual's rehabilitation program is the industrial rehabilitation department and neurosurgical service for the treatment of paraplegia cases to be established this fall at Haynes Memorial Hospital in Boston. Liberty Mutual is establishing this in cooperation with the Massachusetts Memorial Hospitals and the Boston University School of Medicine. To house the new facility, Liberty Mutual is rebuilding and re-equipping the east wing of Haynes Memorial Hospital to handle 26 paraplegia patients and to provide an operating room for neurosurgery and a lecture amphitheater for instructing medical students in this new and specialized field. These facilities have been under construction for several months and are expected to be opened in September.

Hanson said this development pioneers a new philosophy of medical care involving a comprehensive treatment of the patient until he is fully restored to society and back at work. "This is central to the philosophy of rehabilitation," Hanson said, "and in time we believe rehabilitation will be made a part of the medical care given in all hospitals and also a part of medical training."

His report also revealed that to further the general knowledge of industrial rehabilitation, Liberty Mutual had this year produced a movie entitled "A Place For Courage" that portrays the activity at the company's Boston center and shows graphically what rehabilitation can do for the disabled. This film is now being distributed to television stations nationally under the sponsorship of the President's Committee on Employment of the Physically Handicapped.

The report noted that the estimated cost of work accidents in 1953, latest year of completed figures, came to some $3,150,000,000, "a staggering total which emphasizes the vital need for loss prevention work and for rehabilitation."

Hanson stated that under many state laws serious industrial injuries can cost between $200,000 and $400,000 for surgery, hospitalization and life-time nursing care. "Our own company records show that we are maintaining reserves totaling nearly $7,000,000 on open cases involving spinal cord injury and more than $7,000,000 on open cases involving heart conditions allegedly related to industrial injury."

The best answer to the problems raised here of reducing the costs of injury and the loss to industry and to society in general, which gravely concern industrial management, labor union officials, insurance executives and legislators, lies in a sound rehabilitation program, Hanson said. The report concludes with a plea that all those concerned, especially the medical profession, industry and insurance, make an effort to broaden the general understanding of rehabilitation and increase its practice.

"The ultimate beneficiary is the country at large since this makes productive people out of the disabled and converts tax consumers into tax producers," Hanson said.

Multiple Unit?

Construction of just one big bomber requires more than 165,000 tools in its some 184,000 parts, *American Machinist* says. Moreover, it takes 8,954 parts and 87 different specialists to build one of the engines which power some of the newer military aircraft.

WSE Personals

The director of the Ipatieff high pressure and catalytic laboratory at Northwestern University recently became the second American scientist ever to receive the $1,000 Fritzsche award for research in the field of essential oils.

Herman Pines received the award at a meeting in Minneapolis of the American Chemical Society. The prize, given this year for the eighth time, has gone to only one other American, A. J. Haagen-Smit, of the California Institute of Technology.

Pines received the award for his study of the nature of chemical reactions of terpenes, common ingredients of volatile oils with characteristic odors. These essential oils, found in plants, are used in the manufacture of perfumes.

Pines has been on the Northwestern faculty since 1941.

* * *

Stowe Myers has been named chair-

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man of the second annual Chicago Area Industrial Design exhibit to be staged Nov. 7 through 18 at Illinois Institute of Technology, Chicago.

Myers, Evanston, Ill., independent industrial designer, served on the executive committee for the 1954 show.

Sponsored by the Chicago chapters of the Society of Industrial Design and the Industrial Design Institute, the two-week display will feature mass-produced products designed by members of the two organizations and recently placed on the market.

The exhibit will be displayed at Illinois Tech's newly completed Architecture-Planning-Design building, 34th and State Sts.

Originally scheduled for Oct. 30 through Nov. 11, the exhibit has been delayed to permit completion of the interior of the new IIT structure.

* * *

J. E. Deckert, MWSE, director, Deckert Corporation, has advised the Western Society of the removal of the firm's offices to 6340 Capulina Ave., Morton Grove, Ill. The telephone num-

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Joseph J. Sandman, MWSE, formerly a designer with the American Bridge Division of the United States Steel Corporation, has retired.

Registration at Forum Stands at High Mark

The young engineers are out in force! Registration for the sixth Young Engineers' Forum stands at over 130.

The series of six meetings began on Sept. 26 when Joseph L. Block, president of Inland Steel Company spoke at the forum on "Steel."

The other Forum meetings scheduled included:

Oct. 3 — Chemical
Louis Ware, President, International Minerals & Chemical Corporation

Oct. 17 — Accounting
Leonard Spacek, Partner, Arthur Anderson & Co.

Oct. 24 — Electronics
W. W. McDowell, Vice President in charge of Engineering, International Business Machines Corporation

Oct. 31 — Construction
Edgar K. Collison, Vice President, George A. Fuller & Company

Nov. 7 — Heavy Manufacturing
N. C. Dezendorf, Vice President, Electro-Motive Division, General Motors Corporation

Senior members of the Western Society are welcome to attend meetings of the Young Engineers' Forum. They should notify the office of the Society, however, giving the particular night they will attend.

Timbers are Used For Firing Range

The ends of eight-foot timbers have been used to line the sides of a new close-quarter air force firing range. The timbers can be fired at from all angles with little or no danger that the bullets will ricochet. Wood also has the advantage of being able to withstand great shock and absorb sound, the National Lumber Manufacturers Association points out.

WSE Applications

In accordance with the By-Laws of the Western Society of Engineers, the following names of applicants are being submitted to the Admissions committee for examination as to their qualifications for admission to membership into the Society in the various grades, i.e., Student, Associate, Member, Affiliate, etc. All applicants must meet the highest standards of character and professionalism in order to qualify for admissions, and each member of the Society should be alert to his responsibility to assist the Admissions committee in establishing that these standards are met. Any member of the Society, therefore, who has information relative to the qualifications or fitness of any of the applicants listed below, should inform the Secretary's office. The Secretary's office is located at 84 East Randolph Street. The telephone number is RAndolph 6-1736.

17-55 Albert F. Sperry, President, Panellit, Inc., 7401 N. Hamlin Ave., Skokie, Ill.

18-55 Lewis W. Post, Plant Engineer Assistant, Illinois Bell Telephone Co., 6317 S. Maryland Ave.

19-55 H. E. Biedinger, 1201 Beacon St., East Chicago, Ind.

20-55 Albert H. Rosenbaum, Layout Draftsman, United States Steel Corp., West Mill Div., Gary, Ind.

21-55 Michael Shaw, Manager-Sales Engrg. Dept., Standard Fruit & Steamship Co., 944 St. Charles, New Orleans, La.

22-55 H. L. Dalzell, Sales Promotion Mgr., Central States Div., Thompson Electric Co. of Cleveland, 1111 Power Ave., Cleveland, O.

23-55 Ben A. Zimmer, Engineer-Highway Bureau, Portland Cement Assn., 33 W. Grand Ave.

24-55 John D. Burns, Sales, American Steel Band Co., 221 N. LaSalle St.

25-55 Aggie J. Boulahanis, Engineer in Charge, City of Chicago, Water Works Construction, 188 W. Randolph St.

26-55 J. Dale Appleberry, Shop Supervisor, Link-Belt Co., 2410 W. 18th St.

Misdirection

"Misdirected engineering plans" given to China by Soviet engineers have been blamed for increased floods in Central China, *Engineering News-Record* says. It is reported that the number and severity of floods in this area have increased with the number of river engineering jobs done in recent years, and latest floods are said to have reached such a proportion that flood news is critically censored.

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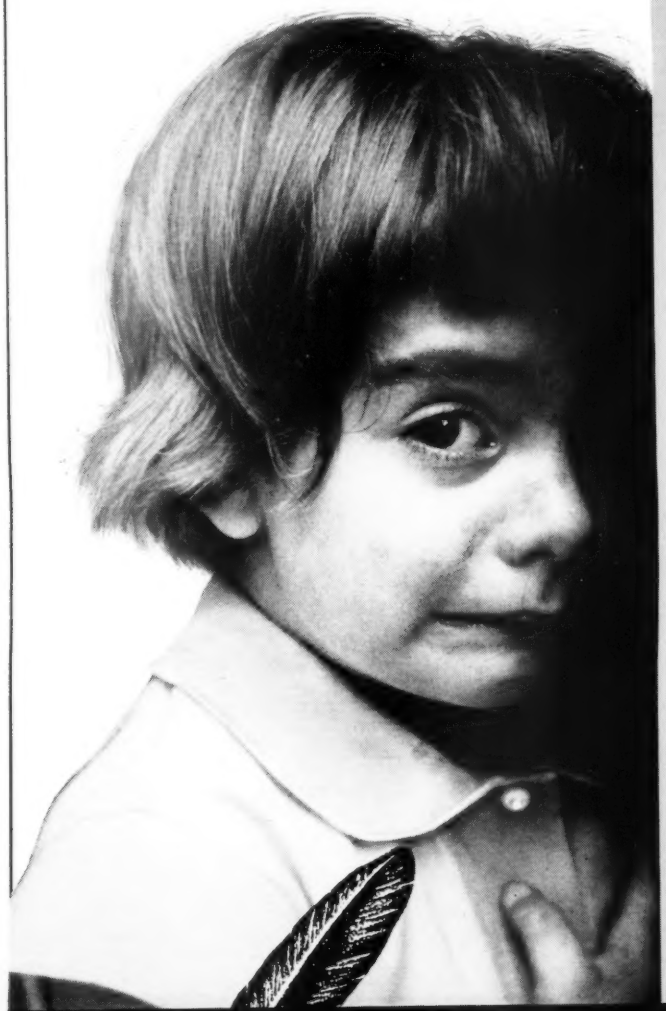

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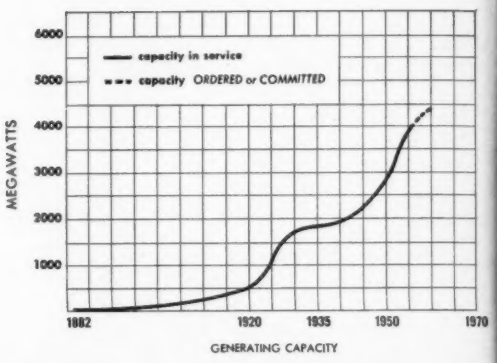

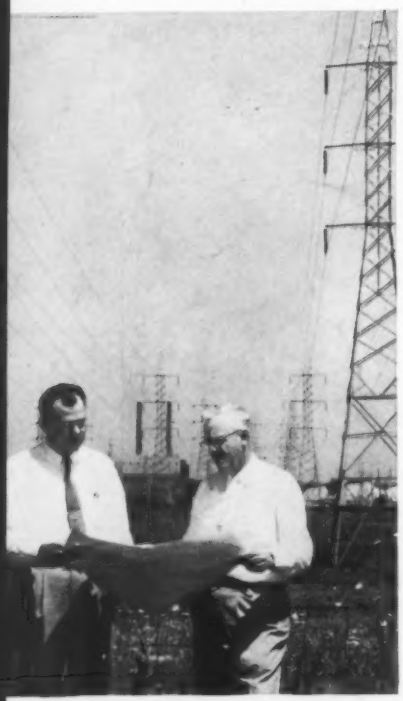

F. C. Armstrong, Staff Assistant to the General Superintendent of Electrical Construction, discusses future transmission line plans with Engineer, Robert Wienberg. Higher transmission voltages, better design, new construction methods are expected to help do the job.

Some people have called the electric industry's future "fantastic". Others, more conservative, say it will be merely "tremendous".

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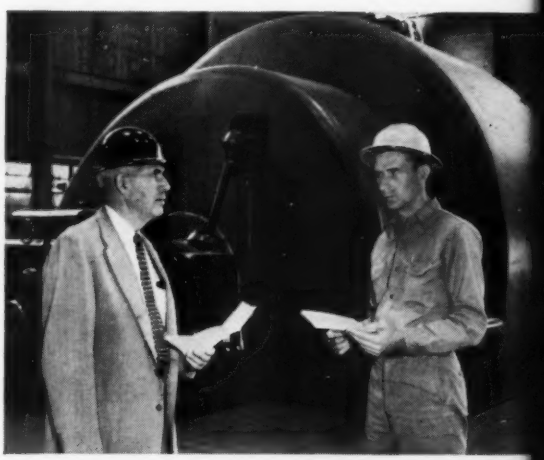
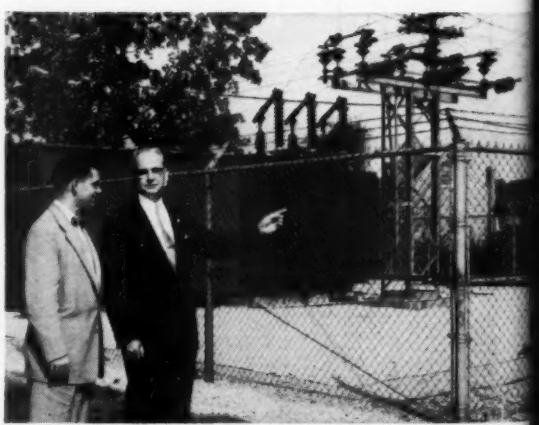


Assistant Superintendent of Station Construction, N. D. Barnett, discusses construction problems with Engineer, Leonard Basinski. Nuclear energy, larger and more efficient boilers and generators will soon present new and challenging problems.



In front of new unit distribution center, System Distribution Engineer, F. A. Cox, and Engineer, George Landgren, discuss possibilities of using higher primary and secondary voltages to meet the growing demand for electricity.

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